

Device and method for determining tone ringing frequency

PATENT CLAIMS

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1. A method for determining tone ringing frequency, with the following steps:

10 forming a ZC signal from a tone ringing signal by comparing the tone ringing signal with a threshold (S), the ZC signal having a succession of alternately rising and falling edges between two ZC signal values;

15 measuring the respective time duration between the adjacent rising and falling edges of the ZC signal;

comparing the measured time durations with a predetermined time duration limit value (t_g);

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defining an evaluation start time (t_1) if a measured time duration is greater than or equal to the time duration limit value (t_g), the evaluation start time (t_1) being the instant of the subsequent edge;

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defining an evaluation stop time (t_2) if a measured time duration with an identical ZC signal value to the next-but-one instance is greater than or equal to the time duration limit value (t_g),

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determining the frequency (f) on the basis of the
5 measured time difference between the evaluation
start time (t_1) and the evaluation stop time (t_2).

defining a monitoring time window (T_u , T_o) for the frequency determination; and

3. The method for determining tone ringing frequency as claimed in one of the preceding claims, characterized in that the time duration limit value (t_a) is defined as a constant.

4. The method for determining tone ringing frequency
as claimed in either of claims 1 and 2,
characterized in that a value which is as great as
possible is defined for the time duration limit
value (t_g), with which the attempt to define the
evaluation start time (t_1) is commenced; and this
value is reduced in accordance with a predetermined
algorithm if no evaluation start time (t_1) can be
defined after a certain time.

5. A device for determining tone ringing frequency, with:

5 a ZC signal generating means for forming a ZC signal from a tone ringing signal by comparing the tone ringing signal with a threshold (S), the ZC signal having a succession of alternately rising and falling edges between two ZC signal values;

10 a measuring means for measuring the respective time duration between the adjacent rising and falling edges of the ZC signal;

15 a comparison means for comparing the measured time durations with a predetermined time duration limit value (t_g);

a defining means for defining

20 i) an evaluation start time (t_1) if a measured time duration is greater than or equal to the time duration limit value (t_g), the evaluation start time (t_1) being the instant of the subsequent edge;

25 ii) defining an evaluation stop time (t_2) if a measured time duration with an identical ZC signal value to the next-but-one instance is greater than or equal to the time duration limit value (t_g), the evaluation stop time (t_2) being the instant of the subsequent edge;
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a frequency-determining means for determining the frequency (f) on the basis of the measured time difference between the evaluation start time (t_1) and the evaluation stop time (t_2).

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6. The device for determining tone ringing frequency as claimed in claim 5, characterized in that the defining means for defining a monitoring time window (T_u , T_o) is designed for the frequency determination and for discontinuing the measurement if the time measured since the evaluation start time (t_1) lies outside the monitoring time window.

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7. The device for determining tone ringing frequency as claimed in either of the preceding claims 5 and 6, characterized in that the defining means defines the time duration limit value (t_g) as a constant.

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8. The device for determining tone ringing frequency as claimed in either of claims 5 and 6, characterized in that the defining means defines a value which is as great as possible for the time duration limit value (t_g), with which the attempt to define the evaluation start time (t_1) is commenced; and this value can be reduced in accordance with a predetermined algorithm if no evaluation start time (t_1) can be defined after a certain time.

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